

*Co-sponsored by
EES and CSES*

Frontiers in Geoscience Colloquium

Monday, July 25, 2016

3:00pm – 4:00pm

Physics Auditorium (TA-3, Bldg 215)

Geochemical Evolution of Hydraulically-Fractured Shales

Dr. J. Alexandra Hakala

Department of Energy, National Energy Technology Laboratory

Improving hydrocarbon recovery while minimizing environmental impacts is a focus for unconventional oil and gas research within the Office of Fossil Energy. In hydraulically-fractured shales, gas recovery is controlled by the operator's ability to generate, connect, and maintain gas flow from the fracture network. A current high-end estimate for natural gas recovery from hydraulically-fractured Marcellus Shale is around 50%, meaning that at least half of the resource is left in place. Geochemical reactions may affect flow within the fractures through precipitation and dissolution of minerals along fracture surfaces. Predicting which geochemical reactions will occur, along with their location along the fractures and their impact on gas flow, is a challenge due to the dynamic nature of hydraulic fracturing operations. The variable composition of fracturing chemicals added to the system, along with reactive minerals within the shale, lead to multiple geochemical scenarios that could affect the evolution of the fractured shale network and ability to enhance gas recovery. This presentation will focus on laboratory-based experiments simulating downhole Marcellus Shale conditions to evaluate how reactions between shale and fracturing fluids can affect mineral dissolution and precipitation along fracture pathways, and whether specific chemical tracers measured in produced waters collected at the surface can identify these reactions in hydraulically-fractured shale.

Host: George Guthrie, EES-DO, 7-2996